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The local and global stability of confined planar wakes at Re = 100 MATTHEW JUNIPER, University of Cambridge, OUTI TAMMISOLA, FREDRIK LUNDELL, KTH, Stockholm — At high Reynolds numbers, wake flows become more unstable when they are confined between two flat plates. At Reynolds numbers around 100, however, global stability analyses suggest that such flows become more stable when confined, while local stability analyses suggest that they become more unstable. In this theoretical and numerical study, we combine global and local stability analyses of planar wake flows at Re = 100 to resolve this apparent contradiction. We find that confinement acts in three ways: it modifies the length of the recirculation zone if one exists, it brings the boundary layers closer to the shear layers, and it can make the flow more locally absolutely unstable. In wake flows at Re = 100 with free slip boundaries, the first and third effects work together to make the flow more unstable. In wake flows at Re = 100 with no slip boundaries, the first two effects work against the third to make the flow more stable. By combining local and global analyses, we have been able to isolate these three effects and resolve the apparent contradictions in previous work.

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